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Enough Food to Go Around?

Is the ghost of Malthus walking today? The problem of food resources vs. population growth has become one of increasing public concern, since the American people have assumed heavy obligations in regard to the underfed peoples of the world. We review some recent discussion.

Two hundred years ago, it is estimated, the world's population was a little over 400 million; now it is estimated at over 2,000,000,000 persons, more than one half in southern and eastern Asia. Some estimators look to an increase of 500 million within 25 years. According to John Boyd Orr, head of the UN's Food and Agriculture Organization, two thirds of the people of the world, even before the war, were undernourished all the time.

The world has about four billion acres of arable land, according to the U. S. Department of Agriculture; but another authority, at Cornell University, estimates only 2.6 billion adapted to food production, or a little over one acre for each living person. American nutritionists calculate that an average of 2½ acres per person is needed for an adequate standard of living. The processes of conservation of arable land are said to be greatly exceeded by the processes of impairment and destruction. Simple arithmetic, if these figures are reliable, indicates a tremendous human problem. "The tide of the world's population is rising," says one eminent scientist, "and the reservoir of the world's living resources is falling."

Public interest in this problem has been stimulated this year by two widely discussed books: *Our Plundered Planet*,[1] by Fairfield Osborn, and *Road to Survival*,[2] by William Vogt. They present a view called by critics "Neo-Malthusian." Magazine articles also have discussed the problem; for example, "Too Many People" in *Harper's* (February 1948) equally Neo-Malthusian, and a more optimistic article in *Time* (Nov. 8, 1948) which questions some of Vogt's facts and conclusions.

The American people are concerned with the continuance of an adequate food supply for our own people, with the conservation of our own irreplaceable resources and the constant renewal of the replaceable, and with the progressive elimination of wasteful practices, in order that a high level of living may be maintained for ourselves and our children. How are we doing?

We are concerned also with the relief and rehabilitation of war-racked nations; with the possibilities of aid to restive peoples whose low level of living invites recourse to violent and futile remedies; with the increasing tension between the well-fed and the ill-fed as a cause of internal conflict and external aggression. The Atlantic Charter stated "freedom from want" and "freedom from fear" as proper objectives of national and international policy. Is there and can there be "enough to go around"?

I. THE FOOD RESOURCES OF THE UNITED STATES

Both Osborn and Vogt condemn the record of the American people in the waste of our natural resources and view with alarm our present situation. Some reviewers, on the other hand, find mitigating facts.

1. Destroying Our Birthright

"The story of our nation in the last century," writes Osborn, "as regards the use of forests, grasslands, wildlife, and water sources, is the most violent and the most destructive of any written in the long history of civilization . . . human energy unthinking and uncontrolled."

In his extensive bill of particulars Vogt recounts the successive abandonment of lands, after a few years of successful cultivation, from the eastern seaboard westward—by exhaustion of fertility and erosion by wind and water. "Over thousands of square miles of the United States, watersheds have been deforested and overgrazed. Thousands of silted stock-ponds, power and water reservoirs, and miles of muddy, flooding rivers show the effects of this devegetation." He quotes Hugh H. Bennett: "In the short life of this country we have essentially destroyed 282 million acres of land, crop and rangeland. . . . About 100 million acres of cropland, much of it representing the best cropland we have is finished. . . . We cannot restore it. . . . We have no large aggregates of land to which we may turn. We are losing every day as the result of erosion the equivalent of 200 40-acre farms. . . . It is gone, gone, forever."

"Free enterprise," says Vogt, "must bear a large share of the responsibility for devastated forests, vanishing wildlife, crippled ranges, a gullied continent, and roaring flood crests. Free enterprise—divorced from biophysical understanding and social responsibility." He asks "those who would preserve what is left of free enterprise" to provide the answers to two questions: "Could free enterprise have made this country powerful and prosperous and democratically free if it had not been endowed with perhaps the world's greatest store of natural treasure? And can enterprise remain even partially

[1] Boston, Little, Brown and Co., 1948. $2.00.
[2] New York, William Sloane Associates, Inc., 1948. $4.00.

free if we continue to waste our birthright like a sailor on a bender?" "Anyone who tends to feel complacent about the American land should look long and thoughtfully at our muddy rivers . . . long and hard at Congress, at our pressure groups, at big business, at our farmers, stock raisers, and lumbermen. . . . We are engaged in a complicated process of . . . self-cannibalism."

"The present living standard for 145 million people," Vogt concludes, "is being maintained only by living on our resource capital. Within about 150 years we have lost one third of our topsoil, more than half of our high-grade timber, an unknown proportion of reserve waters, and a large but unmeasured part of our wildlife. As we reduce our capital, our income from interest naturally falls; so we use still more capital. Obviously, this cannot continue indefinitely. . . . We have heavily mortgaged the welfare of our children and grandchildren—as our ancestors put ours in pawn."

2. Other Views

The editors of *Time* fear that this "alarm is so loud that it may have the effect of deafening the world to its opportunities. To the real agricultural scientists . . . such pessimism sounds silly or worse. Every main article of the Neo-Malthusian creed, they say, is either false or distorted or unprovable."

The view that soil resources cannot be stretched, "that each acre has a certain productive capacity . . . which cannot be boosted without dire peril," is called a fallacy. "The soil scientists say that it is simply not true that land is static. . . . Man is not the servant of the soil, they say; he is its master. Another thing they laugh at is the familiar phrase, 'irreplaceable topsoil.' Topsoil should certainly be cherished and protected . . . but it is not irreplaceable."

The "second main dogma of the Neo-Malthusians" is likewise criticized: that "the productivity of the world's cultivated land is falling now and is sure to fall even more because of erosion and exhaustion"; that "the enormous crops that the United States raised this year are a cruel illusion . . . achieved by 'soil mining,' and will be paid for inexorably in future crop failures." According to *Time,* "this is not true everywhere, say the soil men, and it need not be true anywhere. . . . Soil mining and erosion are still causing inestimable damage, but not so much as before. The U. S. Soil Conservation Service believes that U. S. soils are now getting better, on the whole; the downward trend has been reversed.

"In many parts of the country, such as the Northeast, there was never much erosion, and most of this has been checked. The cottongrowing South, notorious for its stripped and deserted farms, has had a real agricultural rebirth. There are still obstinate farmers who cling to land-wrecking practices, and will surely pay for it, but the face of the South has changed." Among current practices mentioned are the increased planting of grass and legumes, terracing of steeper fields, and contour plowing. And "once abandoned farms have been turned into terraced grainfields."

The article in *Time,* however, does not discuss Vogt's description of the enormous waste of resources represented by muddy and flooding rivers, by loss of water tables, by reckless destruction of forests, by overgrazing of forest and grasslands, by dry farming tillage of range lands, and by uneconomic sanitation.

To other reviewers the invective of the so-called Neo-Malthusians against our trusteeship of our national heritage, with their exposition of what may be expected if the same destructive policies and practices continue, seems to have a timely validity, even though an intelligent and all-out application of modern scientific knowledge might mitigate the consequences.

James Rorty, author of *Tomorrow's Food,* regards Vogt's estimate of the carrying capacity of the American land as "startlingly low," and contrary to the estimates of competent soil scientists (*The New Leader,* Sept. 11, 1948). He disapproves also Vogt's disparagement of the "substantial progress made by TVA . . . in collaboration with the land-grant colleges of the seven Valley states" and the notable achievements of the Soil Conservation Service elsewhere. Nevertheless, in spite of these "narrow, ill-informed, and crudely partisan judgments," he says that Vogt's book in other respects "does a most valuable job of popular education."

In the research study made by the Twentieth Century Fund (*America's Needs and Resources,* 1947) the section on "Rural and Regional Development" reveals, clearly if not dramatically, the continuing impairment of our natural resources and the extent and cost of the task of adequately checking it. The economical management of these resources, with the extensive application of scientific knowledge, is impeded by the magnitude of the task, by the short-sighted selfishness of individuals and groups, and by popular complacency.

II. WORLD RESOURCES AND WORLD POPULATION

Both Vogt and Osborn devote most attention, however, to the world situation. Bernard M. Baruch, in his introduction to *Road to Survival,* calls it an "attempt . . . to show man as part of his total environment, what he is doing to that environment on a world scale, and what that environment is doing to him . . . how more than two billion men and women and children . . . are to be fed, and sheltered, and clothed, and whether or not they are to live in peace, tomorrow, and next year, and in the year 1975."

Vogt uses a formula as the basis of his discussion, "C=B:E". By "C" he represents the "carrying capacity of any area of land" or "its ability to provide food, drink, and shelter to the creatures that live on it"—in the case of human beings the fundamental necessities of "civilized existence." This "carrying capacity" is determined by the ratio between "biotic potential" ("B")—the ability of the land to produce plants which synthesize food from the raw materials of the earth and air in a form assimilable by animals—and "environmental resistance" ("E"), the limitations put on the biotic potential by the environment, including human actions.

The biotic potential of any land area has a theoretical ceiling, almost never reached, but practically reduced by man's restrictive activities. Vogt admits that in some areas use of the land has been and is being "adapted to its innate capabilities," but holds that "modern agriculture has not raised the earth's biotic potential" or, "except in very limited areas . . . reduced environmental resistances. Over most of the earth it has enormously *increased*" these resistances, while industrialization and other factors have been multiplying the population and thereby accelerating the exhaustion of resources.

We will not sketch Vogt's treatment of Latin American countries. He considers all but "three or four" of them already overpopulated, and finds management of existing natural resources throughout Latin America "an almost complete void." As chief of the Conservation

Section of the Pan-American Union, Vogt writes from firsthand observation and knowledge of this area.

He calls Africa "the dying land" and discounts its possibilities as a potential source of food supply for Europe. Nearly all of it he calls at best "marginal for agriculture," with an increasing population overcrowding the most favorable areas.

Europe a "Parasite"

In his treatment of Europe Vogt attacks the problem of growth in population vigorously. He shows that the living standards of European countries which do not possess rich overseas colonies are closely related to their birth rates in inverse proportion. Rumania, Greece, Poland, and Italy have the highest birth rates, and similar rates of population increase, averaging over 1 per cent a year. "Two of the countries we have been most generously aiding," he notes, "at the expense of our own living standard, . . . are two that, by failure to control their reproductive rate, are most rapidly reducing their capacity for self-help."

In some countries of Western Europe, however, which are "well adapted to production of cereals and grapes, . . . man has learned the fine arts of rotation, fallowing, fertilizing, etc." and agriculture is maintained "on a sustained yield rather than an extractive basis. . . . The biotic potential is more nearly realized. Nevertheless this is far from being a universal condition and mounting population pressures reverse the trend." During the war countries dependent on overseas "for a large proportion of their food supplies" stepped up the output of food by increasing the acreage of essential crops, by reducing animal production (since pigs, poultry, etc., consume far more food than they provide), and by other means. But "if Europe could not feed on the lands of other parts of the world, millions of her people would die, most years, of cold and starvation. . . . All these countries expect or will expect to be fed from non-European lands and they expect—even insist on—not falling but *rising* living standards."

Vogt devotes some special attention to Greece and Italy, where there is only about ¾ of an acre of arable land per person. In Greece he sees no prospect of checking the long-time deterioration or achieving partial restoration of soil without vast resettlement of population and doubts the success of industrialization in providing an export surplus (to compete with the goods of highly industrialized countries). Meanwhile Greece "may be expected to double her population in 59 years." As to Italy Count Sforza is quoted: "We are overpopulated. We cannot possibly feed so many hungry mouths." But the population, at the present rate of increase, will double again within the lifetime of persons now living.

"To the extent that our aid increases the European population, to that extent do we increase Europe's difficulties and our own danger. . . . Vital statisticians solemnly tell us that if we wait long enough population curves will level off and birth rates be adjusted 'naturally' to death rates. What may happen to the world meanwhile they seem to regard as one of those bothersome realities" to be politely ignored. But "stabilization and eventual reduction in population in Europe would be one of the longest steps that could be made toward world peace and well-being. A United States of Europe" then "could probably maintain a standard of living that would equal or exceed that of the United States." Even the partial achievement of the "four freedoms," he believes, "far more than much of the world realizes," is dependent on the stabilization of population.

Asia Explosive with Overpopulation

In Asia, says Vogt, "except for . . . [the] areas of land now so saturated with human populations that living standards are appallingly low, there is little unoccupied good land, except in the USSR." (Vogt includes Soviet Russia in his chapter on Asia.) In the USSR Vogt accepts a total of 433 million acres of arable land, of which 85 per cent was under cultivation in 1940, and infers that "there would not seem to be, here, a great deal of room for expansion." (Other estimates, however, run as high as a million acres "potentially suitable for agriculture.") "The Ukraine, the Soviet breadbasket, resembles in climate and vegetation the great plains of Montana and Saskatchewan—hardly . . . favorable environment."

North of the Caspian Sea and extending eastward almost to China are the Russian steppes, "an area of short grass and a rainfall of only 12 to 16 inches. Enormous expanses of productive, granular chernozem soils [black soil] have developed here, under conditions of low precipitation." But, he adds, "no people on earth has yet successfully come to terms with such an environment. We painfully learned from our own 'Dust Bowl' what happens when the sod cover is plowed. . . . It may be that with irrigation and scientific planting and cropping the soil can be kept in place. These measures, however, assume that the population pressures shall not be excessive."

Japan, Vogt reminds us, "is faced with the problem of how to fill empty stomachs with a population of three thousand per square mile of arable land"—nearly five to the acre. With crop yields per acre among the highest in the world, with expert management of land, including watersheds, and with a rapid introduction of Western technology, Japan was not able to raise the living standards of her people to anywhere near the Western level. The world put up barriers against her increasing need to barter manufactured products for food and raw materials, while her population tripled within 60 years. An explosive expansion over to the already crowded mainland resulted. "Expansion of food production within Japan must remain an insignificant possibility. An obvious step toward striking a balance between need and supply would be to reduce the need"; but limitation of growth to available resources would require heroic measures.

China, it is estimated, has nearly half a billion people to feed. It has less than one-half acre of arable land per person. Intensive and excessive cultivation of the land on account of the mounting number of people has reduced the arable area. "The early home of Chinese civilization in the northwest . . . region" is now barren and torn up by erosion. "The headwaters, no longer absorbed by a porous soil, tear down the hillsides in increasing torrents; and the most disastrous floods in the world . . . are now normal and expected occurrences. The Yellow River transports an annual load of 2,500 million tons of soil" (Jacks and Whyte's *Vanishing Lands*).

While war and flood and famine have lately reduced the net growth of population, "some population authorities," according to Walker in the *Harper's* article, predict a doubling of population within a century "if things 'merely go along past lines'" and a trebling of it with "peace and a period of rapid economic development." Vogt says that "China quite literally *cannot feed more people*. . . . Foreign areas that can supply food are not

likely to buy Chinese products in sufficient amounts to take care of considerably increased numbers of empty stomachs. The greatest tragedy that China could suffer, at present, would be a reduction in her death rate."

India is called by Vogt "the demographic nadir," a land of "the limiting factor rampant," "the victim of her own awful fecundity." There is "in all the world," he says, "probably no region of greater misery, and almost certainly none with less hope." Her population was long held in check, at about 100 million, by disease, famine, and fighting. But in recent years, with "the application of scientific knowledge to the problems of production and health encouraged by a stable and effective government," the death rate has been reduced, and "between 1921 and 1941 there was an increase of about 83 million in India's population." (W. S. Thompson in the *Annals* of the American Academy, January 1947.)

Vogt quotes Dr. Chandrasekhar (*India's Population*): "India's population today [1946, before division] exceeds 400 millions, and at the lowest minimum of 1,400 calories she can feed less than 300 million people! That is, more than 100 million . . . are either starving or on the brink of starvation." Vogt continues: "India is *increasing her population* at the rate of 14,000 per day. In the decade 1931-40 this people grew by 50 millions—more than the total population of England, Scotland, and Wales—and, to feed and nourish them all, the most optimistic cannot find more than 447 million acres of land even potentially capable of being brought under the plow."

A leading Indian economist (R. Mukergee, *Races, Lands, and Food*) is quoted as insisting on the necessity for the Indian and Chinese peoples to expand into vast open spaces, in North and South America and Australia. "The facts force us to ask," remarks Dr. Thompson (*op. cit.*), "why we should regard it of unquestioned benefit to man to have 400 million Indians in 1945 where there were about 250 million in 1870. . . . As . . . [they] increase in numbers and as they learn to manufacture steel and the implements of modern war, will they want more *Lebensraum?*" Vogt believes that "a heavily industrialized India, backed up by such population pressure, would be a danger to the entire world." Walker remarks (in *Harper's, op. cit.*): "If India," with her fantastic human fecundity, "can reduce her death rate to that of the United States, she can fill five earths . . . in a century."

In the East Indies also Walker notes the tremendous increase in population of Java under Dutch rule—now nearly 50 million people in an area less than that of Wisconsin or North Carolina. In another generation, he predicts, the population per square mile will have increased from 800 to 1,400. The Philippine Republic is doubling its population, he states, every 31 years.

More Optimistic Opinions

The editors of *Time*, however, say that soil scientists "are sure that the modern world has both the soil and the scientific knowledge to feed, and feed well, twice as many people as are living today. By the time population has increased that much, man may (and probably will) have discovered new ways of increasing his food supply."

"United States soil men know," says *Time*, "that many once fertile regions are in terrible shape, but they also know that a constant stream of admiring foreign visitors from Latin America, India, China, the Near East, has come to learn U. S. methods. . . . How quickly the practice of conservation will spread throughout the world, U. S. soil men cannot say; but they do say that the obstacles are economic and social, not technical. . . . There is plenty of new soil. Some can be worked by old familiar methods; some will require the methods recently developed. Enormous areas, especially in the tropics, will almost certainly yield, sooner or later, to scientific agriculture."

Dr. Robert M. Salter, chief of U. S. Agricultural Research Administration, is cited as concluding, from a study of FAO estimates of food needs, that if 10 per cent of the podsols (cleared forest land) were cultivated by methods now used in Finland and 20 per cent of the tropical red soils by methods used in the Philippines, "their production added to that of present croplands efficiently cultivated, would jump the world's total food to more than twice the 1960 target set by FAO." It is added that "such an expansion would require new railroads, factories, cities, and vast amounts of capital. Hundreds of millions of people would have to move to new areas. But, if the world wants to make the great effort, it can, by applying present-day techniques, provide food for more than twice the present population."

The editors of *Time* admit that "the early stages of industrialization in any country seem to be associated with . . . a jump in population. The steep rise does not continue long. The death rate goes on dropping, as better medical services become available; but the birth rate drops too, and the curve of population increase levels off. . . . Nearly every industrialized nation has passed through these stages." (The duration of each stage is not suggested; in Japan the "steep rise" after the beginning of industrialization tripled the population in 60 years, and produced a tremendous explosion.) It is noted that "some nations and religious groups make vigorous efforts to increase the number of their people," but it is added that "they are seldom if ever successful," as illustrated in "thoroughly Roman Catholic Eire," which has "one of the lowest birth rates in the world."

"Are any countries . . . overpopulated?" asks *Time*, and continues: "A country is overpopulated when its people cannot get enough food. This is seldom because they have too little land. Usually it is because their social organization and farming methods are ineffective. India is a hungry country but it is not permanently overpopulated." India's average of 10 bushels of wheat to the acre is compared with Denmark's 50; its rice yield of 750 lb. an acre with Japan's 3,000. "If Indians liked corn and produced 136.24 bushels an acre," like one farmer in North Carolina, they would have plenty to eat and "enough left over for all the Hindus' sacred cows."

"The wide spread between present food production and potential production, even in China and India, is vitally significant (and hopeful). Both great nations, in spite of civil disturbances, are beginning to industrialize. When their populations rise, following the classic curve, they can probably raise enough food to keep their people supplied until the curve begins to flatten out normally." So concludes *Time*.

Vogt's answer is that "there is not time" to rest on optimistic assumptions. He sees no overnight general improvement in resource management, no quick restoration of replaceable resources, no immediate change in population trends. But he would have the peoples of the world made conscious of the problem, avoid any actions that will retard its solution, and take all practicable steps, nationally and internationally, toward reaching a balance between resources and population.

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